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EXAMINER	
DUNCAN, MARC M	

ART UNIT	PAPER NUMBER
2113	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/851,299	LEE ET AL.	
	Examiner	Art Unit	
	Marc M Duncan	2113	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 May 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,7,8,10,12,13,15-19,21,22,24-38,40,41 and 44* is/are rejected.

7)☒ Claim(s) *3-6,9,11,14,20,23,39,42 and 43* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 May 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

Claims 24-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

Claims 1, 2, 10, 13, 15, 16, 22, 35, 41 and 44 are rejected under 35 U.S.C. 102(e) as being anticipated by D'Errico.

Claims 7, 8, 17, 18, 19, 36, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over D'Errico and Cisco.

Claims 12, 21 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over D'Errico in view of Bakke et al.

Claims 1, 15, 24 and 35 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9, 19, 28 and 40 of copending Application No. 09/850,909.

Claims 3, 4, 5, 6, 9, 11, 14, 20, 23, 39, 42 and 43 are objected to.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 24-34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to

which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The examiner believes, after reading the specification (specifically page 34 and figure 16), that applicant intends, in claim 24, to claim a controller that is responsible for selecting a path to be used by a source node to send a communication to a destination node. The examiner believes that this controller then sends the communications, encoded with the selected path, to the source node over a connection to the source node that is separate from the connections between the source and destination nodes.

The current claim language, however, does not recite such a structure. In claim 24, applicant claims "a plurality of independent communication paths between the source node and a destination node" in lines 3-5. Applicant further claims "wherein the controller is further configured to communicate the communications to the source node by selecting one of the communication paths according to a preference" in lines 9-11.

Lines 9-11, as currently written, state that the controller is communicating communications to the source node by selecting a communication path from the plurality of independent communication paths. It can therefore be seen that in this current claim language the controller is communicating the communications to the source node using one of the independent communication paths.

In lines 3-5 of the claim it is clearly stated that the plurality of independent communication paths run between the source node and a destination node. It can be seen, therefore, that in its current state, the claim requires that the controller either reside on the destination node or reside interposed between the source and the

destination. Such a structure would be necessary because the claims requires that the independent communication paths reside between the source and the destination, while at the same time stating that the controller sends communications to the source using one of the independent communication paths. The examiner found no teaching of such a structure in either the specification or the drawings. The claim has therefore been determined to lack enablement. The examiner suggests that applicant amend the claim language to clarify that the communications from the controller to the source node are not being sent via the independent communication paths that connect the source and destination nodes in order to remove this rejection. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 10, 13, 15, 16, 22, 35, 41 and 44 are rejected under 35 U.S.C. 102(e) as being anticipated by D'Errico.

Regarding claim 1:

D'Errico teaches assigning a preference to each of a plurality of communication paths between a source node and a destination node in col. col. 3 lines 55-57.

D'Errico teaches wherein each preference indicates a relative measure of how often one of the communication paths should be selected for sending one of a plurality of communications in col. 3 lines 55-65. Indicating a preference is necessarily a relative measure of how often a path should be selected. If a path is preferred over another path, it will be selected more often than the other path. For example, if a certain path is assigned a preference for a communication even once and selected that one time, the path has been selected more often relative to the unselected path.

D'Errico teaches wherein each preference indicates that a corresponding communication path should be chosen at least once when sending the communications in col. 3 lines 55-65.

D'Errico teaches receiving one of the communications to be sent from a source node to a destination node in col. 1 lines 15-17 and col. 3 lines 55-57 and Fig. 1.

D'Errico teaches selecting a communication path from the plurality of communication paths between the source node and the destination node in col. 2 lines 6-15 and col. 3 lines 55-57.

D'Errico teaches sending the communication on the selected communication path from the source node to the destination node in col. 2 lines 6-15 and col. 3 lines 55-57.

D'Errico teaches repeating said receiving, said selecting and said sending for a plurality of communications to be sent from the source node to the destination node, wherein said selecting is performed so that a more preferred path is selected more often than a less preferred path in col. 2 lines 6-15 and col. 3 lines 55-65.

D'Errico teaches wherein each of the communication paths between the source node and the destination node is independent of the other communication paths in Fig. 1.

Regarding claim 2:

D'Errico teaches wherein the plurality of communications comprises communications to one or more disk drives in Fig. 1. All communications are directed to the disk drives.

Regarding claim 10:

D'Errico teaches wherein each preference comprises a ranking of one of the communication paths in col. 3 lines 55-65.

Regarding claim 13:

D'Errico teaches wherein said selecting the communication path comprises calculating the communication path in col. 3 lines 56-58. Determining a shortest path comprises calculating the communication path.

Regarding claim 15:

D'Errico teaches a plurality of nodes interconnected by an interconnection fabric, and wherein a portion of the nodes is coupled to one or more storage devices in Fig. 1.

D'Errico teaches a source configured to send a plurality of communications to a destination node, wherein the source comprises a source node and a source device configured to communicate with the source node in col. 1 lines 15-17 and col. 3 lines 55-57 and Fig. 1.

D'Errico teaches wherein the source is further configured to send the communications from the source node to the destination node by selecting one of a plurality of communication paths between the source node and the destination node according to a preference assigned to that communication path, wherein the source is configured to repeatedly select communication paths until all of the communications are sent, and wherein the source is configured to select a more preferred communication path more frequently than a less preferred communication path in col. 2 lines 6-15 and col. 3 lines 55-65.

D'Errico teaches wherein the source is further configured to select each of the plurality of communication paths at least once and thus to send at least one of the communications on each of the communication paths in col. 2 lines 6-15 and col. 3 lines 60-63.

D'Errico teaches wherein each of the plurality of communication paths between the source node and the destination node is independent of the other communication paths in Fig. 1.

Regarding claim 16:

D'Errico teaches wherein the plurality of communications comprises communications to one or more disk drives in Fig. 1. All communications are directed to the disk drives.

Regarding claim 22:

D'Errico teaches wherein the source is further configured to select the communication path by calculating the communication path in col. 3 lines 56-58.

Regarding claim 35:

D'Errico teaches a node, comprising: a routing unit, a plurality of input ports, and a plurality of output ports in Fig. 1, col. 2 lines 46-49 and col. 14 lines 13-17.

D'Errico teaches wherein the node is configured to be connected to an interconnection fabric coupling together a plurality of nodes and comprising a plurality of independent communication paths between the node and a destination node in Fig. 1.

D'Errico teaches wherein the routing unit is configured to send a plurality of communications on the independent communication paths to one or more disk drives coupled to the destination node in col. 2 lines 6-15 and col. 3 lines 60-63 and Fig. 1.

D'Errico teaches wherein the routing unit is further configured to send the communications to the one or more disk drives coupled to the destination node by selecting on of the communications paths according to a preference assigned to that communication path and sending a communication on the selected communication path, wherein the routing unit is configured to repeatedly select communication paths and send communications until all of the communications are sent in col. 2 lines 6-15, col. 3 lines 55-57 and col. 3 lines 60-63.

D'Errico teaches wherein the routing unit is configured to select a more preferred communication path more frequently than a less preferred communication path in col. 2 lines 6-15 and col. 3 lines 55-65.

D'Errico teaches wherein the routing unit is further configured to select each of the independent communication paths at least once and thus to send at least one of the

communications on each of the communication paths in col. 2 lines 6-15 and col. 3 lines 60-63.

Regarding claim 41:

D'Errico teaches wherein the routing unit is further configured to select the communication path by calculating the communication path in col. 3 lines 56-58.

Regarding claim 44:

D'Errico teaches wherein one of the output ports is configured to communicate with a disk drive in Fig. 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 7, 8, 17, 18, 19, 36, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over D'Errico and Cisco.

Regarding claims 7, 17, 18, 36 and 37:

The teachings of D'Errico are outlined above.

D'Errico further teaches selecting a next communication path to send a communication using a round robin method. D'Errico also teaches a routing unit in col. 14 lines 16-17.

D'Errico does not explicitly teach a routing table wherein the routing comprises a plurality of entries and each entry indicates one of the communication paths. D'Errico does, however, teach a routing unit and a method of selecting a next communication path to send a communication.

Cisco teaches a routing table wherein the routing comprises a plurality of entries and each entry indicates one of the communication paths in the definition of routing table.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the routing table of Cisco with the routing unit of D'Errico.

One of ordinary skill in the art at the time of invention would have been motivated to combine the teachings because D'Errico teaches a routing unit and a method of selecting a next communication path. The routing table defined by Cisco meets the inherent need of D'Errico for a way to store and keep track of the communication paths to allow the method of D'Errico to be practiced.

Regarding claims 8, 19 and 38:

D'Errico and Cisco teach wherein the source is further configured to select one of the communication paths a number of times relative to the other communication paths, wherein the number of times corresponds to a number of entries for that communication

path in the routing table (see above citations to D'Errico and Cisco). The examiner considers this function to be inherent to the combination of D'Errico and Cisco. D'Errico teaches selecting a path in a round robin manner, i.e. one after another. The paths are therefore selected one by one, in order. It is necessarily true in such a system that the number of times a particular path is selected is dependent on the number of entries in the routing table for that path and therefore the number of times a particular path is selected relative to any other path is a function of each path's number of entries relative to every other path.

Claims 12, 21 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over D'Errico in view of Bakke et al.

Regarding claims 12, 21 and 40:

The teachings of D'Errico are outlined above.

D'Errico does not explicitly teach detecting an error on one of the communication paths during said sending of one of the communications and resending on a different one of the communication paths the one of the communications that was being sent when the error was detected. D'Errico does, however, teach the use of multi-path systems for fault tolerance reasons.

Bakke explicitly teaches detecting an error on one of the communication paths during said sending of one of the communications and resending on a different one of the communication paths the one of the communications that was being sent when the error was detected in the Abstract lines 17-19.

It would have been obvious to one of ordinary skill in the art at the time of invention to combine the alternate path teachings of Bakke with the multi-path system of D'Errico.

One of ordinary skill in the art at the time of invention would have been motivated to combine the teachings because D'Errico teaches that multi-path systems can be used for fault tolerance without a specific teaching of using a simultaneous operation multi-path system for fault tolerance. Bakke provides such a teaching. The system and method of Bakke allows for dynamic management of a multipath storage system while allowing for fault tolerance, a need expressed by D'Errico.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 15, 24 and 35 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9, 19, 28 and 40 of copending Application No. 09/850,909. Although the conflicting claims are not identical, they are not patentably distinct from each other.

Claim 1 of the 09/851,299 application recites:

A method for routing communications in a storage system, comprising:

assigning a preference to each of a plurality of communication paths between a source node and a destination node, *wherein each preference indicates a relative measure of how often one of the communication paths should be selected for sending one of a plurality of communications*, and wherein each preference indicates that a corresponding communication path should be chosen at least once when sending the communications;

receiving one of the communications to be sent from the source node to the destination node;

selecting a communication path from the plurality of communication paths between the source node and the destination node;

sending the communication on the selected communication path from the source node to the destination node; and

repeating said receiving, said selecting, and said sending for a plurality of communications to be sent from the source node to the destination node, wherein said selecting is performed so that a more preferred path is selected more often than a less preferred path;

wherein each of the communication paths between the source node and the destination node is independent of the other communication paths.

Claim 9 of the 09/850,909 application recites:

A method for routing communications in a storage system, comprising:

receiving a communication to be sent from a source node to a destination node;

selecting a communication path from a plurality of communication paths between the source node and the destination node;

sending the communication on the selected communication path from the source node to the destination node; and

repeating said receiving, said selecting, and said sending for a plurality of communications to be sent from the source node to the destination node, wherein said selecting is performed so that each of the communication paths between the source node and the destination node is systematically selected at least once and *whereby all of the communication paths are used for sending at least one of the communications*;

wherein each of the communication paths between the source node and the destination node is independent of the other communication paths; and

wherein at least one of the communication paths passes through a node other than the source node and the destination node;

assigning a preference to each of the plurality of communication paths between the source node and the destination node; and wherein said repeating said selecting comprises selecting each of the communication paths according to its preference so that a more preferred communication path is selected more often than a less preferred communications path.

It can be seen when comparing the two claims that the differences are as follows:

Application 09/851,299 contains the limitation *wherein each preference indicates a relative measure of how often one of the communication paths should be selected for sending one of a plurality of communications.*

It can clearly be seen that the italicized limitation is equivalent to the limitation of 09/850,909 that states that "a more preferred communication path is selected more often than a less preferred communication path." The fact that a more preferred communication is selected more often than a less preferred path defines a relative measure of how often the communication paths should be selected compared to other of the communication paths. The limitation of indicating a relative measure is therefore inherently present in recitation of a more preferred communication path. If a path is given a status of being more preferred, it is necessarily true that the preference state of being more preferred indicates a relative measure of the frequency of selection of each communication path.

The rejection above is exemplary of the conflict present between claims 1 and 9, claims 15 and 19, claims 24 and 28, and claims 35 and 40. The same reasoning

applies to each of the claims pairs and claim pair 1 and 9 has been shown for the sake of brevity and clarity of the rejection.

Claims 1, 15 and 35 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9, 19 and 40 of copending Application No. 09/850,909. Although the conflicting claims are not identical, they are not patentably distinct from each other because it is well settled that the omission of an element and its function is an obvious expedient if the remaining elements perform the same function as before. In re Karlson, 136 USPQ 184 (CCPA 1963).

The teachings of claim 9 of Application No. 09/850,909 are outlined above.

Applicant's instant claim 1 does not teach:

wherein at least one of the communication paths passes through a node other than the source node and the destination node;

Applicant has clearly removed elements from a copending claim along with their respective function as an obvious expedient.

The rejection above is exemplary of the conflict present between claims 1 and 9, claims 15 and 19, and claims 35 and 40. The same reasoning applies to each of the claims pairs and claim pair 1 and 9 has been shown for the sake of brevity and clarity of the rejection.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Allowable Subject Matter

Claims 3, 4, 5, 6, 9, 11, 14, 20, 23, 39, 42 and 43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Prior art was not found that explicitly teaches or fairly suggests wherein said assigning comprises assigning static preference values to each of the communication paths as outlined in claims 3. Prior art was not found that explicitly teaches or fairly suggests wherein the number of entries for that communication path in the routing table corresponds to a preference assigned to that communication path as outlined in 9, 20 and 39. Prior art was not found that explicitly teaches or fairly suggests wherein each preference comprises a percentage of the plurality of communications that should be sent using one of the communication paths as outlined in claim 11. Prior art was not found that explicitly teaches or fairly suggests calculating the communication path from a pair of coordinates as outlined in claims 14, 23 and 42. Prior art was not found that explicitly teaches or fairly suggests one of the input ports of the node being configured to communicate with a RAID controller as outlined in claim 43. The limitations are considered allowable only when taken in combination with the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art not relied upon contains elements of the instant claims and/or represents a current state of the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marc M Duncan whose telephone number is 571-272-3646. The examiner can normally be reached on M-T and TH-F 6:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Beausoliel can be reached on 571-272-3645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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